Fuzzy interpolative controller and Applications

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Overview

Since the introduction of Fuzzy set theory by Zadeh in 1965 it was clear that fuzzy theory was an extraordinary tool for representing human knowledge. Nevertheless, L. Zadeh himself established in 1973 that sometimes, in decision-making processes, knowledge is better represented by means of some generalizations of fuzzy sets. In the applied field, in particular, the success of the use of fuzzy set theory depends on the choice of the membership function that we make. However, there are applications in which experts do not have precise knowledge of the membership function that should be taken. In these cases, it is appropriate to represent the membership degree of each element to the fuzzy set by means of an interval. From these considerations arises the extension of fuzzy sets called theory of Interval-valued Fuzzy Sets (IVFSs), that is, fuzzy sets such that the membership degree of each element of the fuzzy set is given by a closed subinterval of the interval [0, 1]. In nature there are many examples that could help humanity to develop new projects, to improve and to solve some real life complex problems. Fuzzy adaptive control has been an important area of active research and significant developments have been seen, including theoretical success and practical design. One of the reasons for the rapid growth of fuzzy adaptive control is its ability to control plants with uncertainties during its operation. On the other hand, due to the highly nonlinear and time-varying nature with unmolded dynamics, effective uses of computational intelligence techniques such as fuzzy systems for the controlling and modeling can be used by electrical engineers for solving wide variety of problems. The course will be taught in a manner that participants can use the theoretical ideas for solving their research problems.

Course participants will learn these topics through lectures and MATLAB simulations. Also case studies and assignments will be shared to stimulate research motivation of participants.

Dates	19 September to 26 September 2016
Place	Department of Electrical Engineering, National Institute of Technology, Silchar, Assam, India.
Modules	A: Fuzzy set theory and Fuzzy logic: Sep 19 - Sep 20 B: Fuzzy adaptive control for nonlinear systems : Sep 21 - Sep 22 C: Fuzzy interpolative controller with Applications: Sep 23 – Sep 26 NUMBER OF PARTICIPANTS FOR THE COURSE IS LIMITED TO FIFTY (50)
Who can Participate…	• UG, PG students and research scholars of all areas of engineering and applied sciences. • Practicing engineers working on control and control related applications in following industries (but not limited to) - aerospace, automobile, bio-medical, space-sciences, structural dynamics, manufacturing, robotics, power systems etc. • Applied and computational mathematicians and other scientists desirous of learning of how linear algebra problems arise in control systems design and analysis and are solved using sophisticated techniques of numerical linear algebra.
Fees	The participation fees for taking the course is as follows: Participants from abroad : US $500 Industry/ Research Organizations: INR 5,000 Academic Institutions (Faculty): INR 2,500 Academic Institutions (Students) : INR 1,000 The above fee include all instructional materials, computer use for tutorials and assignments, laboratory equipment usage charges, 24 hr free internet facility. The participants will be provided with accommodation on payment basis.
Benefits from the course	• Students can earn extra credit by attending this prestigious GIAN course taught by professor from foreign university. • Opportunity to learn application of fuzzy control to nonlinear systems systematically. • Opportunity for participant to formulate research problem with the experts. • Opportunity to establish research links with the faculties from Europe. • Opportunity to solve hands on problems in adaptive control with applications.

The **Faculty**

Prof. Valentina E. Balas is currently Full Professor in the Department of Automatics and Applied Software at the Faculty of Engineering, University "Aurel Vlaicu" Arad (Romania). She holds a Ph.D. in Applied Electronics and Telecommunications from Polytechnic University of Timisoara. She is author of more than 180 research papers in refereed journals and International Conferences. Her research interests are in Intelligent Systems, Fuzzy Control, Soft Computing, Smart Sensors, Information Fusion, Modeling and Simulation. She is a member of EUSFLAT, ACM and a Senior Member IEEE, member in TC – Fuzzy Systems (IEEE CIS), member in TC - Emergent Technologies (IEEE CIS), member in TC – Soft Computing (IEEE SMCS) and also a member in IFAC - TC 3.2 Computational Intelligence in Control.

Dr. Balas is Vice-president (Awards) of IFSA International Fuzzy Systems Association Council and Join Secretary of Joint Secretary of the Governing Council of Forum for Interdisciplinary Mathematics (FIM), - A Multidisciplinary Academic Body, India.

Dr. Rajeeb Dey is an Assistant Professor in the Department of Electrical Engineering, NIT Silchar, Assam, India. His research interest include time-delay and fuzzy time-delay system and control.

Course Coordinators

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